## REMARKS

Applicant here submits the following arguments made in an Amendment filed July 9, 2004, pursuant to 37 C.F.R. § 706.07(h), first and second paragraphs.

Figure 3 is described as follows at pages 22-24 of applicant's specification:

> FIG. 3 illustrates the preferred embodiment of the invention. In FIG. 3, a tunable laser emits a pulsed optical radiation beam. The beam is preferably pulsed in a regular and periodic manner at between 20 and 20,000 cycles per second. The pulsed beam is generated by modulating the power supply 9 between an on state and an off state at the desired pulse frequency. The laser 11 and the calorimetric gas cell 8 (also referred to as an optoacoustic gas cell by those skilled in the art) are placed in an optical cavity formed by a first mirror 13 and a second mirror 15. The pulsed beam is passed through the calorimetric gas cell 8 at two frequencies, each at a distinct and different time. **The first frequency corresponds to a fundamental absorption peak frequency of the specified component and the second frequency does not correspond to a fundamental absorption peak frequency of the specified component.** A microphone 25 is placed within the calorimetric gas cell 8 and connected to appropriate electronic circuitry 27 for measuring the signal output of the microphone 25. The apparatus of FIG. 3 may also be constructed with more than one microphone placed into the calorimetric gas cell 8 and connected to the electronic circuitry 25. The vacuum pump 21, the first valve 5, and the second valve 23 act in combination as previously described to draw a gas sample of exhaled breath 1 into the calorimetric gas cell 8, the exhaled breath 1 suspected of comprising a specified component.
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> When the beam passes through the calorimetric gas cell 8 at the first frequency, the specified component absorbs energy from the beam. This energy absorption causes slight heating within the exhaled breath 1 in the calorimetric gas cell 8. The heating occurs at regular and periodic intervals because the beam is pulsed and no absorption or heating occurs between pulses. The periodic heating of the exhaled breath 1 causes pressure fluctuations to be generated and propagated within the calorimetric gas cell 8. These pressure fluctuations are sound waves, known by those skilled in the art as optoacoustic signals, having a frequency that is approximately equal to the pulse frequency of the beam and an amplitude that is proportional to the absorption by the selected component. The microphone 25 detects the optoacoustic

signals and generates a first signal output at the chopping frequency, $S_{AC}(f_1)$, that is measured and recorded by the electronic circuitry 27. As in the embodiment depicted in FIG. 1, a detector 17 detects the transmitted portion of the beam as the second signal output, which is measured and recorded by appropriate electronic circuitry 19.

When the beam passes through the calorimetric gas cell 8 at the second frequency, the specified component does not absorb energy from the beam. Therefore, no optoacoustic signal is should be present at the second frequency. **However, if an optoacoustic signal is present at the second frequency, the signal is the result of absorption from unknown sources, such as contaminants in the gas or the gas cell itself, and is thus a measurement of background absorption. In circumstances where background absorption is measured, it should be subtracted from the optoacoustic signal measured at the first frequency to obtain the actual absorption by the specified component.** The detector 17 detects and the electronic circuitry 19 measures and records the incident power of the beam at the second frequency.

In the absence of background absorption, concentration of the specified component in the exhaled breath 1, nitric oxide in the following example, is determined using the optoacoustic signal output and is proportioned as set out in the equation below and the accompanying description:

$$NO = constant3 * \frac{S_{AC}(f_1)}{P(f_1)},$$

where $P(f_1)$ is the incident power of the laser 11 at $f_1$ as measured by the detector 17. As before, constant3 is determined by placing a reference sample with a known concentration of nitric oxide in the gas cell 7 and measuring the signal outputs as described above. (Emphasis added.)

It is submitted that the prior art does not disclose a method of employing six signal outputs as claimed in claim 54.

Respectfully submitted,

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